Exponential Functions
Section 4.1

Learning Objectives:

1. Evaluate exponential functions.
2. Graph exponential functions.
3. Evaluate functions with base *e*.
4. Use exponential interest formulas.

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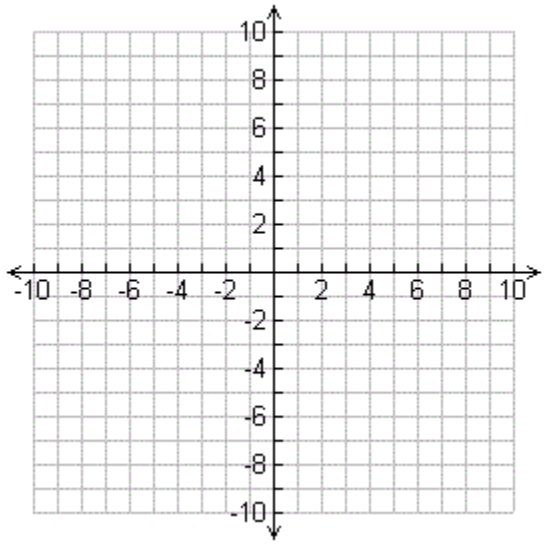
1. Graph the given function by making a table of coordinates.

$$f(x) = 2^x$$

a. Complete the table of coordinates.

x	-2	-1	0	1	2
y					

b. Graph the function below.



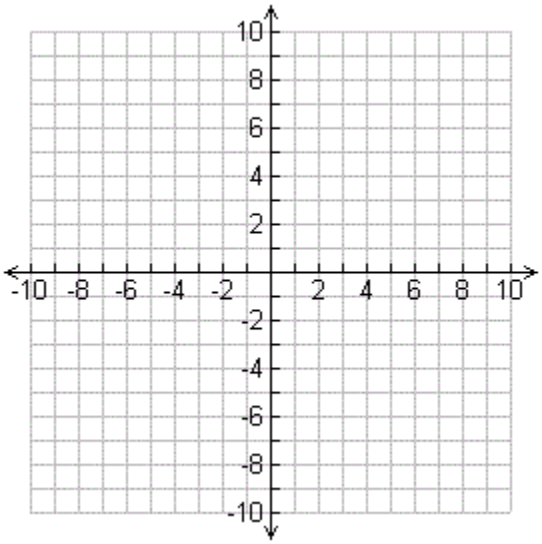
2. Graph the given function by making a table of coordinates.

$$f(x) = \left(\frac{1}{3}\right)^x$$

a. Complete the table of coordinates.

x	-2	-1	0	1	2
y					

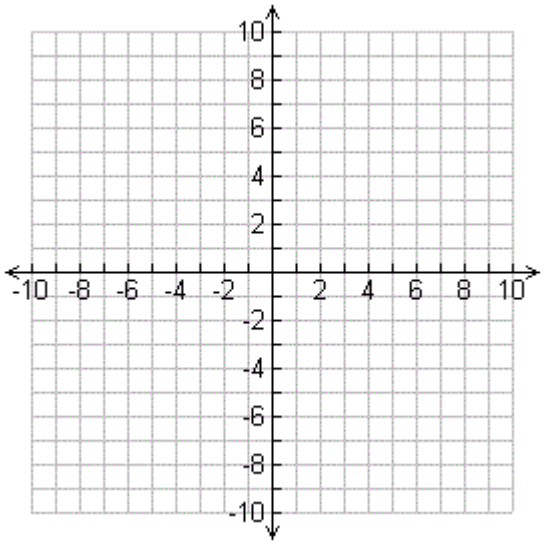
b. Graph the function below.



3. Use transformation of the graph of $f(x) = 2^x$ to graph the function g(x) given below. Graph and give the equation of the asymptote. Use the graph to determine the domain and range of g(x).

$$g(x) = 2^{x-2}$$

a. Graph the function $g(x) = 2^{x-2}$ and its asymptote. Graph the asymptote as a dashed line.



b. What is the equation of the horizontal asymptote of $g(x) = 2^{x-2}$?
y=_____

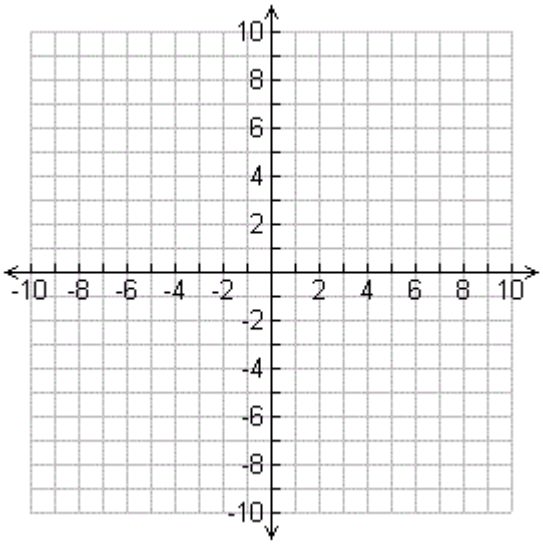
c. What is the domain of $g(x) = 2^{x-2}$?
_____

d. What is the range of $g(x) = 2^{x-2}$?
_____

4. Use transformation of the graph of $f(x) = 2^x$ to graph the function g(x) given below. Graph and give the equation of the asymptote. Use the graph to determine the domain and range of g(x).

$$h(x) = 2^{x+4} + 3$$

a. Graph the function $h(x) = 2^{x+4} + 3$ and its asymptote. Graph the asymptote as a dashed line.



b. What is the equation of the horizontal asymptote of $h(x) = 2^{x+4} + 3$?
y=_____

c. What is the domain of $h(x) = 2^{x+4} + 3$?
_____

d. What is the range of $h(x) = 2^{x+4} + 3$?
_____

5. Use the compound interest formulas $A = P\left(1 + \frac{r}{n}\right)^{nt}$ and $A = Pe^{rt}$ to solve the problem given. Round answer to the nearest cent.

   Find the accumulated value of an investment of $15,000 for 4 years at an interest rate of 4%.

   a. What is the accumulated value if the money is compounded semiannually?

   b. What is the accumulated value if the money is compounded quarterly?

   c. What is the accumulated value if the money is compounded monthly?

   d. What is the accumulated value if the money is compounded continuously?

6. Suppose you have $13,000 to invest. Which of the two rates would yield the larger amount in 2 years: 8% compounded monthly or 7.87% compounded continuously?

   a. 7.87% compounded continuously
   b. 8% compounded monthly

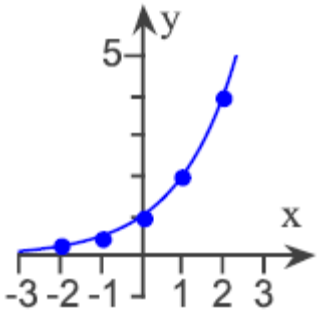
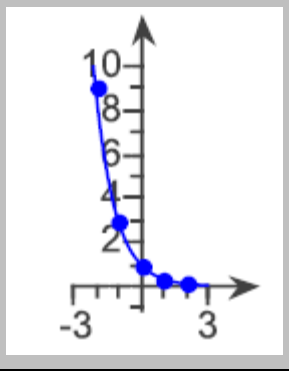
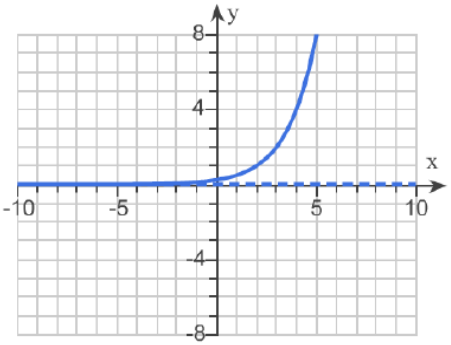
7. The function $f(x) = 70e^{-.4x} + 30$ describes the percentage of information, f(x), that a particular person remembers x weeks after learning the information.
    a. Substitute 0 for x and, without using a calculator, find the percentage of information remembered at the moment it is first learned.

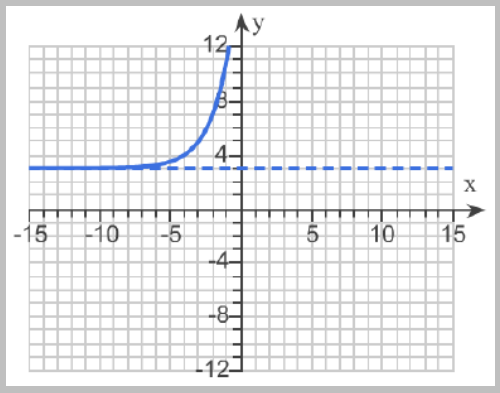
    b. Substitute 1 for x and find the percentage of information that is remembered after 1 week.

    c. Find the percentage of information that is remembered after 8 weeks.

    d. Find the percentage of information that is remembered after one year (52 weeks).

Answer Key:

1.	a.	$\frac{1}{4}, \frac{1}{2}, 1, 2, 4$
	b.	
2.	a.	$9, 3, 1, \frac{1}{3}, \frac{1}{9}$
	b.	
3.	a.	
	b.	$y = 0$
	c.	$(-\infty, \infty)$
	d.	$(0, \infty)$

4.	a.	
	b.	$y = 3$
	c.	$(-\infty, \infty)$
	d.	$(3, \infty)$
5.	a.	\$17,574.89
	b.	\$17,588.68
	c.	\$17,597.98
	d.	\$17,602.66
6.	Answer	8% compounded monthly
7.	a.	100.0%
	b.	76.9%
	c.	32.9%
	d.	30.0%